which considers it worth its while to reprint the papers written by the members of its staff, and the conclusion is forced on us that no one of the dozen polytechnics of London or of the score of technical schools in the large towns of the provinces—Birmingham, Glasgow, Belfast, and others—contributes to the advancement of science so much as Manchester does. In the next place, it may reasonably be asked, Is Manchester doing as much as it ought to do in this direction? To answer this question we must remember that the school cost a third of a million, has a staff of nearly 100, and claims to be second to none in the kingdom in point of equipment. Judging by Continental schools, about one-sixth of the staff might reasonably be expected to be doing something to solve the problems met with in their own departments, and on this basis Manchester does not yet produce its proper quota of research; and if Manchester does not, what must be the state of the other schools of the kingdom? and why are they in this state? They were founded for the training of those who intend to apply science to industry, who can render no greater service to industry than the solution of some of its problems. What better training for this purpose can there be than working out one of those problems under the guidance of a teacher, and how can the teachers act as guides unless they themselves have been pioneers? No technical school is fulfilling its highest purpose when its staff is not carrying out research, but is merely retailing text-book knowledge which, from the nature of things, must be a dozen years behind the times. Yet how many of the schools of the kingdom are content to do nothing better than point to their records of how many thousand students have passed through them, and probably learnt nothing more up-to-date than Euclid or the atomic theory, both of which they might have learnt just as well in any primary school?

THE seventh annual meeting of the North of England Education Conference is to be held on January 7, 8, and 9, 1909. United conferences are to be held in the Manchester Town Hall on the mornings of January 8 and 9, and sectional meetings at the Manchester Municipal School of Technology in the afternoons of the same days. One of the subjects for discussion in the sectional meetings of the second day of the conference is the training of girls in domestic subjects, concerning which papers are to be read by Miss Alice Ravenhill and Miss E. J. Ross. The united conference on the concluding day is for the discussion of the coordination of the curricula in primary and secondary schools, and papers are to be read by Messrs. J. L. Paton and J. W. Iliffe and Miss Isabel Cleghorn. The following subjects are to be considered in sectional meetings on the last day of the conference:—the place of the higher elementary school in the scheme of education, with papers read by Mr. C. H. Wyatt and Prof. J. J. Findlay; the relation of the universities to evening teaching in industrial centres; papers by Messrs. R. H. Tawney and W. J. Bees; and methods of teaching mathematics; papers by Messrs. T. J. Garstang and H. Brotherton. The committee has deemed it desirable to ask delegates to pay a membership subscription of one shilling, which will contribute in some measure towards the expense involved. Admission to the conference meetings will be by ticket, application for which should be made to the honorary secretaries at the Manchester Municipal School of Technology, accompanied by a postal order or stamps for one shilling as membership subscription in respect of each person attending the conference. The committee has arranged to display the Manchester Education Committee's exhibit as shown at the recent Franco-British Exhibition. It is designed to show the complete and varied educational work of a large county borough, and will be set up in the examination hall of the Municipal School of Technology. A comprehensive exhibition of educational apparatus and books will also be arranged.

FOR more than a year a committee, composed of representatives of the University of Oxford, on the one hand, and of labour representatives on the other, has been considering the question of the relation between the University of Oxford and the education or working men. It is expected that the report of the deliberations of the committee will be published shortly. In connection with the same movement a conference, largely attended by delegates of trades unions and other organisations of working men, was held on November 21 at Toynbee Hall. The scheme to be recommended by the Oxford committee in the forthcoming report was described by the joint secretary. The Bishop of Birmingham delivered an address, during the course of which he said it appears to him to be beyond the possibility of question that the proportion of young men who are at Oxford because it is "the right thing" to go to Oxford and because they want to have a good time is ridiculously great. No serious person can think about Oxford without seeing that this is a gross misappropriation of the purposes and resources of the University, and that, by one means or another, it requires fundamental alteration. A system is to be desired in which it shall be understood clearly, and effectively brought about, that persons who do not at once show that they come to the University because they want to be students will have to go elsewhere. If carried out there would be a great displacement of well-to-do young men who want to have a good time by serious students who would come equally from all classes, but in large measure from among the workers. There is in most classes a body of people who want to be serious students, and possess the requisite qualifications. These persons have the right to be at the University, because it exists for such students. The endowments of the place should be so re-arranged as really to be again applicable to the ends for which they were first given, namely, to enable those who have no means of their own, but have the capacity and desire to be students, to avail themselves of the resources and the opportunities of the great centres of learning. Then would follow a re-modelling in the University of the whole scale and standard of living.

SOCIETIES AND ACADEMIES.

LONDON.

Challenger Society, October 28.—Mr. A. E. Shipley, F.R.S., in the chair.—Ostracoda of the Bay of Biscay captured during the 1900 cruise of H.M.S. *Research*: Dr. G. H. **Fowler.** More than 7000 specimens had been identified, and in the case of more than 3000 the sex had been determined and the length of the shell measured. As the result of these measurements the author was enabled to formulate provisionally a new law of growth in Crustacea:—"during early growth each stage increases at each moult by a fixed percentage of its length which is constant for the species and sex"; for this the name of Brooks's law was suggested, Prof. W. K. Brooks having made the first observations which led to it; it had been checked to some extent by observations on lobsters (Herrick) and crabs (Waddington). In several cases it was shown that two stages of the same species had been described as different species. Twenty-five species occurred in the collection, and in some cases as many as five stages had been recognised. As regards the vertical distribution, attention was directed to an increase in the number of specimens captured between 750–400 fathoms as compared with those from 400–100 fathoms, and the suggestion made that this was due to a check in the velocity of fall of dead and dying specimens, produced by the increased viscosity of the water, which in its turn was dependent on increased pressure and diminished temperature. All the four plentiful species, which were recognised on other grounds as mesoplanktonic, attained their maximum intensity in this zone, which would constitute a rich food-zone. Three species were apparently purely mesoplanktonic; eleven reached their maximum intensity in or near the epiplankton, but extended into the mesoplankton, and of these eleven three were apparently purely mesoplanktonic at their oldest stage; four were purely mesoplanktonic. The question of the vertical oscillation of the species was discussed, and several were shown to be more abundant in the epiplankton by night than by day; in one case an attempt was made to trace the movement of the species at different times of day. The proportion of males to females seemed to point to the probability that one species was parthenogenetic.

In another species the death-rate at three stages was worked out, and appeared to be 50 per cent. Except in one case the maximum intensity of closely similar species appeared to be at different levels.

Geological Society, November 4.—Prof. W. J. Sollas, F.R.S., president, in the chair.—The relations of the Nubian Sandstone and the crystalline rocks of Egypt: Hugh J. L. **Beadnell.** The conclusions of previous observers are mainly in favour of the view that the granites are not intrusive into the Nubian Sandstone, but that the latter was deposited round denuded masses of the granite. The crystalline rocks south of the Oasis of Kharga are first dealt with. Eight exposures of crystalline rocks were met. The sediments near the contact with the crystalline rocks are generally inclined at a high angle. The bedded rocks contain no fragments derived from the crystalline rocks. The author concludes that the Nubian Sandstone was unconformably deposited, partly on preexisting sedimentary formations, and partly on the planed-down surfaces of still older crystalline and metamorphic rocks. Subsequently it was invaded by outbursts from the underlying magma, the intrusions being probably connected with the elevation of the mountainous regions on the east side of the Nile.—The fossil plants of the Waldershare and Fredville series of the Kent coalfield: E. A. Newell **Arber.** At the boring at Shakespeare Cliff, Dover, Coal-measures were reached at a depth of 1100 feet, and subsequently penetrated to a depth of about 2270 feet. Thirteen seams of coal, varying in thickness from 1 foot to 4 feet, were pierced. Coal-measures were struck at 1394 feet at the boring in Waldershare Park, and pierced for 1260 feet more. Five seams of coal, varying from 1 foot 4 inches to 5 feet 2 inches in thickness, were struck. The boring near Fredville Park reached Coal-measures at 1363 feet, pierced three seams of coal, and was continued to a depth of 1813 feet. The specimens of plants collected from the Waldershare and Fredville borings were compared with plants found at Dover and in other localities in Britain and abroad. The majority of species tabulated are either confined to the Upper Coal-measures and the transition series below, or are Middle and Lower Coal-measure forms which are known to occur in the transition series. Thus the beds are the homotaxial equivalents of the Newcastle, Etruria, and black-band horizons of north Staffordshire, the Hamstead beds below 1233 feet in south Staffordshire, the Coed-yr-allt beds and Ruabon marls of Denbighshire, the Ardwick series and beds above the Bradford four-foot coal in south Lancashire, the Lower Pennant Grit of South Wales, and the New Rock and Vobster series of Somerset. The majority of species are also common to the highest zone, or the "Charbons Gras," in the Pas de Calais.

Entomological Society, November 4.—Mr. C. O. Waterhouse, president, in the chair.—*Exhibits.*—W. G. **Sheldon**: Examples of *Melitaea aurinia*, var. *iberica*, from Barcelona, taken last May, and examples from various British and Continental localities for comparison, suggesting that eventually this particular form of *aurinia* might prove to be a distinct species.—Rare Tachinidæ: H. W. **Andrews.** A short series of *Gymnosoma rotundatum*, L., and a specimen of *Ocyptera brassicaria*, F.—two uncommon Tachinids—from Glengarriff, co. Cork.—Erebias from the Vosges: P. J. **Barraud.** A series of *Erebia stygne* and *E. ligea* from the French Vosges, taken in June and July this year.—Nonagria new to Britain: E. P. **Sharpe** and A. J. **Wightman.** A series of *Nonagria edelsteni*, wrongly identified as *N. neurica*, Hb., from Sussex, taken in August this year, this being the first time that the species, which is quite distinct, had been observed.—Pseudogynes of *Formica rufa*: H. St. J. **Donisthorpe.** Pseudogynes captured alive at Nethy Bridge in September last, where they occurred in some numbers in two nests of *Formica rufa*, thus indicating that *Atemeles pubicollis*, Bris., a beetle new to Britain, is to be found in Scotland.—Rare British Coleoptera: H. St. J. **Donisthorpe.** Examples of *Harpalus cupreus*, Dej., from Sandown, Isle of Wight (one specimen with red legs discovered by Mr. J. Taylor at Atherstone); *Cafius cicatricosus*, Er., from Southsea; and *Cryptocephalus bipunctatus*, L., taken at Niton, Isle of Wight, where it was discovered by Mr. R. S. Mitford last year.—A "stick" insect—apparently a new species of the genus Melaxinus—bred parthenogenetically by Mr. H. Main: R. **Shelford.**—A long series of hybrid *S. ocellatus* ×*populi*: L. W. **Newman.**—Life-histories of Coleophorids and hybernating Porthesia: H. J. **Turner.** (1) Ova, larvæ, and photomicrographs to illustrate the life-history of *Coleophora virgaureae*. (2) "Nests" of the gregarious hybernating larvæ of *Porthesia chrysorrhoea* from Wakering marshes, Essex; on several parts of the coast this species has now become very abundant again. (3) Dead flower-stems of *Statice limonium* collected on November 1, containing the full-fed hybernating larvæ of *Coleophora limoniella*.—Rare earwig and cells of wasp: W. J. **Lucas.** (1) An example of *Labidura riparia*, Pall. (shore earwig), a large male taken near Bournemouth, August 10, and kept alive since that date. (2) Two cells of the solitary wasp *Eumenes coarctata* found in the New Forest.—Specimens of the genera Celastrina (Cyaniris) and Everes to demonstrate the racial identity of *C. sikkima* and *C. argiolus, C. jynteana* and *C. limbatus, E. diparodes* and *E. argiades*: Dr. T. A. **Chapman.** All these species occur together, and appear to form a mimetic group, but it would be impossible at present to determine which is the model and what may be the object of the mimicry.—The male and female imago, the preserved larva, and the cocoon of an interesting new Lasiocampid from Durban: Prof. E. B. **Poulton.**—Butterflies captured on a patch of zinnias on the north of the Victoria Nyanza: Prof. E. B. **Poulton.** Seventeen specimens were shown of *Danais chrysippus*, L., of the type, and *alcippus* forms together with the intermediate examples, but no single specimen of *dorippus* (*klugii*), although of three females of *Hypolimnas misippus*, L., two were of the *inaria*, Cr., form mimicking *dorippus*.—Specimens of *Heliconius amphitrite*, Riff., and *H. charithonia*, Linn., also a coloured drawing of *H. hermathena*, Hew.: Dr. F. A. **Dixey.** Each of the first two species showed a distinct and well-marked aposeme or warning character, each of them, and especially the first, belonging to an extensive mimetic assemblage. In the third species these two distinct aposemes were combined.—Aberrant forms of *Polyommatus bellargus* and of *Zygaena trifolii* and *Z. hippocrepidis*: Dr. G. G. **Hodgson.**—The life-history of *Erianthus versicolor*, Brunner, an Orthopteron of the family Mastacidæ: J. C. **Kershaw.**

Linnean Society, November 5.—Dr. D. H. Scott, F.R.S., president, in the chair.—Notes on some parasitic Copepoda, with a description of a new species of Chondracanthus = *C. inflatus*: Miss M. E. **Bainbridge.**—Some nemerteans from the eastern Indian Ocean: R. C. **Punnett** and C. F. **Cooper.**—Report on the echinoderms, other than holothurians, collected by Mr. Stanley Gardiner in the western parts of the Indian Ocean: Prof. F. Jeffrey **Bell.**

Mathematical Society, November 12.—Prof. W. Burnside, president, and subsequently Prof. H. M. Macdonald, vice-president, in the chair.—Address of the retiring president: Prof. W. **Burnside.** The address dealt with the neglect of the theory of groups of a finite order by English mathematicians. It was pointed out that numerous opportunities arise in comparatively elementary teaching for emphasising the importance of some of the simpler notions of the theory of groups. If such opportunities were taken a student of the more advanced theory would approach it with a mind already stored with concrete examples.—(1) The second mean value theorem of integral calculus; (2) the representation of a function by means of a series of Legendre's functions: Dr. E. W. **Hobson.** In the second of these papers it is pointed out that a difficulty, not presented in the analogous theory of Fourier's series, arises in the theory of the expansion of a function in a series of Legendre's functions, through the existence of two critical points of the differential equation satisfied by these functions, and an asymptotic formula for the functions of high index, valid in the neighbourhood of the critical points, is obtained.—The eliminant of three quantics in two independent variables: A. L. **Dixon.** A method is given for exhibiting the eliminant as a single determinant, the elements of which are formed by a rule analogous to Bezout's rule for forming the eliminant of two quantics in one independent variable.—The Dirichlet series and the asymptotic expansion of integral functions of zero order: J. E. **Littlewood.**—The norm curves on a given base: Prof. F. **Morley.**—The arithmetical nature of the coefficients in a group of linear substitutions (third paper): Prof. W. **Burnside.**—The conformal transformations of a space of four dimensions and their applications to geometrical optics: H. **Bateman.**—Periodic properties of partitions: D. M. Y. **Sommerville.**—The solution of integral equations: Prof. A. C. **Dixon.**—Note on the continuity or discontinuity of a function defined by an infinite product: G. H. **Hardy.**—The energy and momentum of an ellipsoidal electron: F. B. **Pidduck.**—(1) *q*-Integration; (2) *q*-transformations of power series: Rev. F. H. **Jackson.**—The complete solution in integers of the Eulerian equation $X^4+Y^4=U^4+V^4$: Dr. T. **Stuart.**—Waves of finite amplitude: W. J. **Harrison.**—An asymptotic formula for the generalised hypergeometric series: T. J. I'A. **Bromwich.**—Satellite curves of a plane cubic: A. C. **O'Sullivan.**

Royal Meteorological Society, November 18.—Dr. H. R. Mill, president, in the chair.—Investigation of the electrical state of the upper atmosphere, made at the Howard Estate Observatory, Glossop: W. **Makower,** Miss M. **White,** and E. **Marsden.** There exists under normal atmospheric conditions a potential gradient in the atmosphere surrounding the earth. The earth being negatively charged with respect to the air, a continuous electric current flows from the upper atmosphere to the earth. It follows, therefore, that a kite attached to an earth-connected wire will tend to assume the potential of the air surrounding it, and an electric current will flow continuously down the wire to earth through the winding machine to which the wire is attached. The experiments described in the paper were undertaken with the view of determining the magnitude of this current when the kite was at different heights above the ground. The authors found that in general a high wind produced at a given altitude an abnormally high value of the current flowing down the wire. Whether the action of the wind is to be accounted for by the greater volume of air which passes in a given time over the sails of the kite, so giving a greater volume of air from which electricity is collected, or whether the action of the wind is to be attributed to electrification by friction, the authors find it difficult to say, but there is no question that the velocity of the wind does play an important part in determining the current flowing down the kite wire. In further confirmation it may be added that observations made with a captive balloon in very calm weather gave abnormally low values for the current.—Balloon observations made at Birdhill, co. Limerick, during July and August, 1908: Captain C. H. **Ley.** These observations were carried out on behalf of the joint kite committee of the Royal Meteorological Society and of the British Association. Captain Ley in this paper gave full details of the observations made on twenty-five pilot balloons, seven of which carried registering instruments. The method employed is similar to that known by surveyors as the subtense method, that is, obtaining the range of a known vertical bar by observation of the angle subtended by it at the theodolite with an eye-piece micrometer. In this case the bar is the line joining a hydrogen balloon and a comparatively heavy air-filled balloon, and the balloons appear as discs to be bisected simultaneously by the fixed and movable wire in the diaphragm. Several balloons were observed to a horizontal distance of twenty-four miles. Two of the balloons dropped in the river Shannon; these were sent up in exceptionally calm atmosphere, and Captain Ley considers that the river had a suction effect upon them. The immediate neighbourhood of stratus or cirrus cloud appears to cause a collapse of vertical velocity, and, generally speaking, the highest horizontal velocity of wind appears to occur below the cirrus level. A feature developed during the course of the experiments was the observation of the balloons at night by means of naked acetylene lights. After some trouble these proved quite successful, gave long runs with less risk of being lost in small clouds, and afforded points of light which could be observed on with great accuracy.

Institution of Mining and Metallurgy, November 19.—Mr. Alfred James, president, in the chair.—Notes on tin dressing: H. W. **Hutchin.** A record of investigations of dressing operations conducted at South Crofty Mine with the view of determining the losses incurred in tin dressing and their nature. The ground covered embraced mainly the first stage of concentration, in preparing concentrates for the calciner, and comprised a systematic investigation of the battery tailings. The range of the present inquiry was, however, restricted to tin alone of all the metallic constituents, and in this connection the author had collected a mass of valuable data resulting from experiments with different grades of crushing and different modes of treatment.—Working costs on mines, as practised on the Rand: J. A. **Dennison.** In this paper, which was originally submitted to the standardisation sectional committee of the institution dealing with mine accounts and cost sheets, the author reviews the practice of the Rand with the object of seeing to what extent it is capable of standardisation in itself and as a guide to other localities. His brief is in favour of standardising general principles and systems rather than details, and of securing the utmost simplicity consistent with a clear and full statement of accounts.—A manganese deposit in southern India: R. O. **Ahlers.** A description of the manganese deposits in the native State of Sandur, Bellary district, an elliptical basin composed geologically of a bed of the Dharwar (Archæan) series of schistose rocks, which is surrounded by gneiss, the predominating rock in that part of India. Iron and manganese are intimately associated in the Sandur deposits, which, though of large extent on the surface, go but a short distance in depth. The author inclines to the theory that these ore bodies are the result of metasomatic action, a replacement of the original rock by oxides of manganese and iron, by the agency of meteoric waters.—Extinguishing the fire in the Testasecca Mine, Sicily: F. C. **Chrambach.** A brief description of the method adopted in dealing with an incendiary outbreak in a sulphur mine in Sicily, the operation being greatly assisted by the employment of the Westphalia "rescue" apparatus, whereby the working party was enabled to penetrate and carry on its labours in the highly vitiated air of the underground sections.

Manchester.

Literary and Philosophical Society, October 20.—Prof. H. B. Dixon, F.R.S., president, in the chair.—Further notes on the separation of cobalt and nickel: R. L. **Taylor.** The author referred to a former paper in which he described a modification of Rose's method (barium or calcium carbonate in presence of chlorine or bromine). In that paper he pointed out that various conditions caused a remarkable retardation in the precipitation of the cobalt. He now proposes the use of magnesium carbonate instead of calcium or barium carbonate, and finds that with this there is practically no uncertainty in the action.—Some questions connected with the constitution of the atom: H. **Bateman.** It is shown that a continuous succession of infinitesimal conformal transformations of space can be derived by stereographic projection from a figure on a hypersphere which moves as a rigid body in a space of four dimensions. This gives ten degrees of freedom, so that the model atom would have at most ten degrees of freedom. It is suggested that the number of degrees of freedom possessed by an atom in given circumstances is equal to three *plus* the valency exhibited in those circumstances. When two atoms are in a state of chemical combination there is, in general, a loss of three degrees of freedom for a single bond and five degrees of freedom for a double bond. By means of this rule it is possible to calculate the number of degrees of freedom of a molecule. In the case of a molecule consisting of several atoms there are additional restrictions due to the atoms arranging themselves at equal distances from one another or in a plane. The ratio of the specific heats calculated from the numbers n obtained in this way and the formula $\gamma=1+2/n$ agree with the results of observation.—A collection of fossil insects from Shiobara, Japan, collected by Dr. Marie Stopes: C. Gordon **Hewitt.** In the collection there were a large number of the aquatic larvæ of ephemerids. There were examples of certain larvæ and a single pupa of insects belonging to the dipterous family Culicidæ. In addition to these, a number of different families of Diptera were represented, including one or two excellently preserved specimens of Culicidæ. The insects are preserved in a light grey laminated shale, and the fossiliferous deposit is evidently of fresh-water origin, and appears to belong to the Tertiary age.

November 3.—Prof. H. B. Dixon, F.R.S., president, in the chair.—The nature of the α particle: Prof. E. **Rutherford** and T. **Royds.** In order to give a definite proof of the identity of the α particle with a helium atom, it is necessary to show that helium can be obtained from accumulated α particles, quite independently of the active matter from which they are expelled. This has been done by the authors. In the experiments every precaution was taken to prevent possible contamination of the apparatus with helium. The experiments afford a conclusive proof that the α particle after losing its charge is an atom of helium. Other evidence indicates that the positive charge on the α particle is twice that carried by the hydrogen atom.—The action of the radium emanation on water: T. **Royds** and Prof. E. **Rutherford.**—Some properties of the radium emanation: Prof. E. **Rutherford.** In 1906 (NATURE, October 25) the author directed attention to the fact that the emanations of radium, thorium, and actinium were completely absorbed by cocoa-nut charcoal at ordinary temperatures. He has recently repeated these experiments with much larger quantities of radium emanation, and has found that the actual volume of emanation capable of absorption by charcoal at room temperature is very small. For example, several grams of cocoa-nut charcoal are required to absorb completely the emanation from 200 milligrams of radium at ordinary temperature, although the volume of the gas is only one-tenth of a cubic millimetre. As was to be expected, the absorptive power of charcoal for the emanation increases rapidly with lowering of the temperature. It appears from the results that at 10° C. the charcoal absorbs about 0·03 cubic mm. of emanation per gram, and at −40° C. about 0·06 cubic mm. per gram.

Paris.

Academy of Sciences, November 16.—M. Bouchard in the chair.—Compensation of a closed chain of triangulation: P. **Hatt.** In a closed chain of triangles resulting from a survey, there is necessarily a slight discrepancy at the junction owing to the experimental error. The problem of the distribution of this error round the whole system, giving a polygon with a minimum deformation, in the general case is extremely complicated, and involves an amount of labour out of all proportion to the value of the result. A shortened approximate method of dealing with this problem is given in the present paper.—The turning of aeroplanes: E. L. **Bertin.**—The use of calcium cyanamide in agriculture: A. **Müntz** and P. **Nottin.** It has been shown in previous papers that the rapidity with which nitrogenous manures are converted into nitrates is a measure of their usefulness as manures, and calcium cyanamide has been studied from this point of view. It proved to be as active as ammonium sulphate, and this result was confirmed by culture experiments.—A new species of Sarcocaulon of south Madagascar and the resinous bark of Sarcocaulon: Édouard **Heckel.** The resin is present in the bark to the extent of 20 per cent. to 30 per cent., and owing to its perfume may prove to be of commercial value.—Report on a memoir entitled "Experimental Researches on the Resistance of the Air carried out by M. G. Eiffel": Maurice **Levy** and M. **Sebert.** An account of experiments on the resistance of the air to falling bodies, carried out on the Eiffel Tower. —Yellow fever at Saint-Nazaire: M. **Chantemesse.** The infection was brought from Martinique by the steamship *La France* on September 24, and as no case had developed during the nine days' voyage from the infected port, the vessel was not placed in quarantine by the port authorities. Eleven cases resulted, seven of which were fatal. The infection was carried by the mosquito *Stegomya fasciata*, specimens of which were caught on the ship after the epidemic broke out.—Differential equations of the third order the general integral of which is uniform: R. **Garnier.**—The resistance of fluids: the necessary experiments: Marcel **Brillouin.** The rational construction of aëroplanes requires the experimental determination of numerous coefficients, the more important of which are indicated.—Different curves of the same sung vowel: M. **Marage.**—The radio-activity of the soil: F. **Bordas.** The radiations from radio-active materials are known to possess the property of causing colorations in glass and porcelain, and the fact that in certain regions near the nitrate mines of the province of Aconcagua white glass became coloured has led to the discovery that at certain spots the soil is strongly radio-active.—The volumetric composition of ammonia gas and the atomic weight of nitrogen: Ph. A. **Guye** and A. **Pintza.** Ammonia, set free from a weighed apparatus, was decomposed by passing over an electrically heated platinum spiral, and the mixed gases measured at a definite temperature and pressure. The method, which is not capable of high precision, gave 14·014 as the atomic weight of nitrogen $(\mathrm{O}=16)$, the extreme values being 14·002 and 14·022, a new confirmation of the international value 14·01. —Some constituent principles of *Sclerostomum equinum*. The presence in this parasite of a crystallised alkaloid possessing great hæmolytic power: Th. **Bondouy.**—The colloidal properties of starch and its spontaneous jelly formation: E. **Fouard.**—The preparation of fused alumina in the amorphous state and the reproduction of the blue colour of the Oriental sapphire: Louis **Paris.** The addition of small quantities of lime (2 per cent. or less) to the alumina before fusion has the effect of retaining the blue colour due to cobalt or iron oxides. Without this addition the alumina, on solidification, is colourless, with an external, deeply coloured crust.—Comparative effects of amides as food on the development of the adult plant, the seed, and the free embryo: J. **Lefèvre.**—The presence of *Planaria alpina* in Auvergne: C. **Bruyant.**—The Plumulariidæ of the *Challenger* collection: Armand **Billard.**—A new parasite of *Œnophtira pilleriana* of the vine: Henri **Sicard.**—The extent of the possible colour changes of *Hippolyte varians*: Romuald **Minkiewicz.**—The shaping of mountain slopes: P. **Berthon.**—The stems of Clepsydropsis: Paul **Bertrand.**—The seismic disturbance of November 11, 1908: Alfred **Angot.**

New South Wales.

Royal Society, September 2.—Mr. W. M. Hamlet, president, in the chair.—The discharge of electricity from glowing carbon: Prof. J. A. **Pollock** and A. B. B. **Ranclaud.** The flow of negative electricity from hot carbon, in a circuit containing an air-gap, up to three millimetres in length, between a hot and a cool carbon rod, has been investigated for temperatures of the hot rod from 1100° C. to 1800° C., and for various voltages up to the point at which an arc forms between the carbons, the experiments being made in air at natural pressure. A suggestion is made as to the development of the arc from the non-luminous discharge which seems to account for the observed phenomena. The discontinuity of potential at the surface of the heated carbon, due to the projection of electrons, is found to range from 1·1 volts at 1300° absolute to 16·7 volts at 3690° absolute. From these values the velocities with which electrons are projected from hot carbon are deduced, the results being of the order of 10^8 centimetres per second.—The re-lighting of the carbon arc: Prof. J. A. **Pollock,** Dr. E. M. **Wellisch,** and A. B. B. **Ranclaud.** In connection with the re-lighting of the carbon arc, without movement of the electrodes, when the circuit is opened and re-closed, the relation between the potential difference, established between the carbons at the moment of the re-making of the connections, and the maximum time of interruption of the circuit, within which the arc will re-form, has been investigated for various conditions.—Evidence of recent submergence of coast at Narrabeen: Prof. T. W. E. **David** and G. H. **Halligan.** The general physical features of the N.S. Wales coast are described, as showing distinct evidence of recent coastal submergence. The evidence supplied by bores, shafts, &c., in the vicinity of Sydney and Newcastle, is traversed, and its bearing upon the subject of land movement is discussed. The strongest evidence of all is the finding of an old land surface, with a mangrove fauna and fresh-water flora, at a depth of about 52 feet below high water, at Narrabeen, on the Manly-Pittwater Road. Details of this bore, put down by the authors, assisted by university students, in 1904, are given, and the conclusion arrived at that in this bore we have direct and positive evidence of a submergence of the coast-line, in the vicinity of Sydney, within very recent geological time.

Linnean Society, September 30.—Mr. T. Steel, vice-president, in the chair.—Some remarkable Australian Libellulinæ, part ii., descriptions of new species: R. J. **Tillyard.** The tendency of the Libellulinæ found in tropical Australia appears to be gradual simplification along the following lines:—abolition of superfluous nervures, loss of pruinescence, decrease in size, simplification of colour-pattern, and contraction and intensification of dark pigmentation of the wings. Eight species are added to the Australian list, of which six are proposed as new.—The life-history of *Loranthus exocarpi*, Behr.: C. C. **Brittlebank.**—Geological notes on Kosciusko, with special reference to glacial action: Prof. T. W. Edgeworth **David.** The gneissic granites of Cooma have been proved to pass in places into coarse mica-schists, and the series is classed provisionally as pre-Cambrian. Fossiliferous Ordovician rocks have been found to occur near Berridale. The origin of Lake Coolamatong is attributed to a downthrow fault. The total area covered by the ice calotte of Kosciusko was probably from 80 to 100 square miles. The ice-cap was fully twelve times as large, and at least double the thickness, formerly estimated, while the snow-line was quite 300 feet lower than at present, involving a lowering of the mean temperature by about 10° F. In more recent geological time there was another period of glaciation, during which Lakes Cootapatamba and Albina, the Blue Lake, &c., were formed.—Opsonisation from a bacterial point of view, and opsonic technique: Dr. R. **Greig-Smith.** It was found that a two days' culture of *Staphylococcus aureus* is more completely opsonised than younger or older cultures; the intraphagocytic digestion is the greater the older the culture; there is no auto-opsonic action manifest in moderately old cultures; races of different ages are opsonised to the same extent; bacteria grown upon agar are more easily opsonised than bacteria from bouillon-cultures.—Revision of the Australian Curculionidæ belonging to the subfamily Cryptorhynchides, part ix.: A. M. **Lea.** The ninth instalment of the revision deals with the genus Chætectetorus and some of its allies, of which eleven genera, including four proposed as new and twenty species, including eight proposed as new, are described.

DIARY OF SOCIETIES.

THURSDAY, NOVEMBER 26.

ROYAL SOCIETY, at 4.30.—Some Experiments made to test the Action of Extract of Adrenal Cortex: S. G. Shattock and C. G. Seligmann.—Further Results of the Experimental Treatment of Trypanosomiasis; being a Progress Report to a Committee of the Royal Society: H. G. Plimmer and Captain H. R. Bateman, R.A.M.C.—A Trypanosome from Zanzibar: Colonel Sir David Bruce, C.B., F.R.S., and Captains A. E. Hamerton, D.S.O., and H. R. Bateman.—The Proportion of the Sexes produced by Whites and Coloured Peoples in Cuba: W. Heape, F.R.S.—Further Researches on the Etiology of Endemic Goitre: Captain R. McCarrison, I.M.S.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Domestic Electricity Supply (including Heating and Cooking) as affected by Tariffs: W. R. Cooper.

SOCIETY OF DYERS AND COLOURISTS, at 8. Reaction between Picric Acid and Fibre Colloid: W. P. Dreaper and W. Stokes.—Colouring Matters in Sole Leather: H. G. Crockett.

FRIDAY, NOVEMBER 27.

PHYSICAL SOCIETY, at 5.—A Graphic Method of dealing with Refracting Surfaces: H. S. Allen.—A Method of Determining Moments of Inertia: The late Prof. W. Cassie.—An Experimental Examination of Willard Gibbs's Theory of Surface Condensation regarded as the Basis of Adsorption: W. C. M. Lewis.—On the Diffusion of Actinium and Thorium Emanations: S. Russ.—On the Elliptic Polarization produced by the Direct Transmission of a Plane Polarised Stream through a Plate of Quartz cut in a Direction Oblique to the Optic Axis, with a Method of Determining the Error of a Plate supposed to be Perpendicular to the Axis: James Walker.

SATURDAY, NOVEMBER 28.

ESSEX FIELD CLUB, at 6 (at the Essex Museum of Natural History, Stratford.)—Report of Club's Delegate at Corresponding Societies Committee, British Association, Belfast: Prof. E. G. Coker.—The Re-afforestation of Hainhault: Francis Dent and T. S. Dymond.

MONDAY, NOVEMBER 30.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—The Panama Canal in 1908: Dr. Vaughan Cornish.

ROYAL SOCIETY OF ARTS, at 8.—Twenty Years' Progress in Explosives: Oscar Guttmann.

INSTITUTE OF ACTUARIES, at 5.—Inaugural Address by the President, G. F. Hardy.

TUESDAY, DECEMBER 1.

INSTITUTION OF CIVIL ENGINEERS, at 8.—*Further Discussion*: Glasgow Central Station Extension: D. A. Matheson.—*Possible Paper*: The Rotherhithe Tunnel: E. H. Tabor.

WEDNESDAY, DECEMBER 2.

SOCIETY OF PUBLIC ANALYSTS, at 8.—The Gravimetric Estimation of Antimony and Tin: E. Cahen and Dr. G. T. Morgan.—The Oil from Carapa Guianensis: Dr. J. Lewkowitsch.—The Detection and Estimation of Formaldehyde in Milk: H. S. Shrewsbury and A. W. Knapp.—The Determination of Aldehydes in Oil of Lemon: A. H. Bennett.—Some Analyses of Cream Cheese: C. H. Cribb.

GEOLOGICAL SOCIETY, at 8.—The Geological Interpretation of the Earth-movements Associated with the Californian Earthquake of April 18, 1906: R. D. Oldham.

ROYAL SOCIETY OF ARTS, at 8.—Mechanical Flight: E. S. Bruce.

ENTOMOLOGICAL SOCIETY, at 8.

THURSDAY, DECEMBER 3.

LINNEAN SOCIETY, at 8.—Biscayan Plankton, the Ostracoda: Dr. G. Herbert Fowler.—Note on *Juniperus taxifolia*, Hook. and. Arm.: Bunzō Hayata.—Mimicry in Spiders: R. I. Pocock.

RÖNTGEN SOCIETY, at 8.15.—Phenomena observed in Electrical Currents of Continuous Oscillation: Dr. H. Manders.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY, at 8.—The Influence of Track upon Railway and Tramway Carriages: J. S. Warner.

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